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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/987,232	11/06/2001	Lon E. Bell	BSST.006A	6403

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EXAMINER

PARSONS, THOMAS H

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/987,232

Applicant(s)

BELL, LON E.

Examiner

Thomas H Parsons

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 17 and 20-38 is/are rejected.
- 7) ☒ Claim(s) 13-16, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. Figure 1A should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities:

Page 9, line 18, after "April 27, 2001", suggest inserting --(now U.S. Patent No. 6,539,725)--;

Page 11, line 29, suggest changing "Profile" to --profile--.

Appropriate correction is required.

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Thermoelectric element array operable in a non-steady state manner".

Claim Objections

4. Claims 17 and 23 are objected to because of the following informalities:

Claim 17, line 2, suggest adding a period after “resistance; and,

Claim 23, line 4, suggest deleting the second comma after “operation”.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-17, 20-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghoshal (5,867,990), and further in view of Rich (3,006,979).

Claim 1: Ghoshal Figures 1 and 2 discloses a thermoelectric system (1) comprising a thermoelectric element with at least one first side (11) and at least one second side (12) exhibiting at least one temperature gradient between them during operation, wherein at least a portion of the thermoelectric array is configured to operated (via switches s1 and s2) between at least first and second different current levels, wherein at least the first current level is below a current level that provides substantially maximum steady-state TE cooling or heating (abs.; col. 3: 52-col. 4: 55; col. 5: 27-col. 6: 16).

Goshal does not disclose a plurality of thermoelectric elements forming at least one thermoelectric array wherein the thermoelectric elements are in thermal communication with a heat exchanger on at least the first or second side.

Rich in Figure 2 discloses a plurality of thermoelectric elements (18) forming at least one thermoelectric array wherein the thermoelectric elements (18) are in thermal communication with a heat exchanger (12) on at least the first or second side (10)(col. 2: 25-col. 4: 43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the thermoelectric array with the thermoelectric array of Rich because Rich teaches a thermoelectric array that would have provided an efficient heat exchange tube structure and location for passing a fluid in heat exchange relation with the thermoelectric elements, efficient heat transfer with the thermoelectric junctions, and the desired strength as well as having as a large area of contact with the fluid passing through the tubes thereby improving structural integrity and overall performance of the device.

Claim 23: Goshal in Figure 2 discloses a method of improving efficiency in a thermoelectric system having a thermoelectric element (1) with at least one first side (11) and at least one second side (12) exhibiting at least one temperature gradient between them during operation, the method comprising the step of applying power (2) to thermoelectric element in a non-steady state manner (i.e. switch 7 or 8 open while the other switch is closed) to operate the thermoelectric element between at least a first and second different current levels, wherein at least the first current level is below a current (zero current) that provides substantially maximum steady-state TE cooling or heating.

As to the recitation “a plurality of thermoelectric elements forming at least one thermoelectric array”, the rejection is as set forth above in claim 1.

Claim 2: Because the structure of the Goshal combination is similar to that instantly disclosed, it would have been obvious to one of ordinary skill in the art at the time the invention

was made that the array is configured such that “operation between at least first and second current levels is substantially transient at each level”.

Claims 3, 5, 24, 25, and 27: The Goshal combination discloses that at least some of the thermoelectric elements are configured to exchange heat with at least one working fluid while such thermoelectric elements operate at the first or second current level Goshal shows in Figure 2 and col. 5: 43-col. 6: 4 that when one switch (7 or 8) is open (i.e. zero current) thermoelectric elements of Rich (Figure 2 and, col. 2: 25-col. 4: 43) exchange heat with at least one working fluid while the thermoelectric elements operate at the first current level.

Claims 4, 6, and 26: Goshal in Figure 2 discloses that the first current level is zero (i.e. switch 7 or 8 is opened) (col. 5: 43-col. 6: 4).

Claims 7 and 8: Goshal discloses in Figure 2 that the first current level is substantially below (zero current) a current level that provides substantially maximum steady-state TE cooling or heating (i.e. switch 7 or 8 are opened) (col. 5: 43-col. 6: 4).

Claim 9: Goshal in Figure 2 discloses that the current level is varied among the at least first and second levels (col. 5: 43-col. 6: 4).

Claims 10 and 28: Goshal discloses that the at least first and at least second levels are programmed levels (i.e. controller 9 “selectively establishes” electrical connection to the TE via switches 7 and 8) (col. 5: 43-col. 6: 4).

Claims 11 and 29: Goshal in Figure 2 discloses that at least first and at least second current levels are variable levels (pulsed), providing a cyclic pattern of current application (col. 5: 43-col. 6: 4).

Claims 12 and 30: Goshal in Figure 2 discloses that the at least first and second current levels are selected to provide improved efficiency over steady-state operation (col. 5: 43-col. 6: 4).

Claims 20-22, and 36-38: The recitations “wherein the system is used for...” have been construed as statements of intended and, therefore, given little patentable weight. However, the Goshal combination would be capable of providing the intended use as it is structurally similar to the system instantly disclosed; and, both Goshal and Rich are concerned with heating and cooling.

Claim 31: Goshal in Figure 2 discloses the coupling the thermoelectric elements to a power source for a predetermined period of time, and disconnecting the thermoelectric elements for a predetermined period of time (col. 6: 2-4).

Claim 32: Goshal in Figure 2 shows that a first current level is substantially zero (switch open) and that a second current level is non-zero (switch open) (col. 5: 43-col. 6: 4).

Claim 33: Goshal in Figure 2 discloses that the second current level is different (zero or non-zero) from the first current level, the second current level below, at or above (i.e. switches 7 or 8 are both closed or one is closed while one is open) a current level that provides substantially maximum steady-state TE cooling or heating (col. 5: 43-col. 6: 4).

7. Claims 17 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goshal, and further in view of Rich as applied to claims 1 and 23 above, and further in view of Corry.

Goshal and Rich are as applied, argued, and disclosed above, and incorporated herein.

The Goshal combination does not disclose thermoelectric elements configured to adjust the resistance.

Corry in Figure 3 discloses thermoelectric elements (37 and 38) comprised of a compression spring (44) secured to the end of the thermoelectric elements. Although Corry does not disclose that these elements are configured to adjust the resistance, they are structurally similar to those instantly disclosed, therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have expected the elements of Corry to be configured as claimed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the thermoelectric elements of the Goshal combination with the compression spring of Corry because Corry teaches elements having a compression spring secured thereto that would have 1) improved the shock resistance of the thermoelectric system, 2) permitted greater flexibility in generator design 3) eliminated close tolerances in machining the thermoelectric elements, and 4) maintained excellent thermal contact with the heat exchanger improving reliability, reducing generator costs and improving overall efficiency and performance of the system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H Parsons whose telephone number is (703) 306-9072. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (703) 308-2383. The fax phone numbers for the


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organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Thomas H Parsons
Examiner
Art Unit 1745

May 16, 2003


Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700